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Abstract

One hundred Holstein heifers were used to examine the effects of monensin (Rumensin®) and lasalocid (Bovatec®) included in calf starter and grower diets. Heifers were assigned alternately at birth to a starter feed containing either Rumensin (28 g/ton, 90% dry matter basis) or Bovatec (40 g/ton, 90% dry matter basis). The Bovatec group was switched to a starter feed containing 28 g Bovatec/ton (90% dry matter basis) at 6 weeks of age. Both groups were switched at 8 weeks of age to grower diets designed to deliver 100 mg/head/day of either Rumensin or Bovatec. No treatment differences were observed between birth and 8 weeks of age. Heifers were moved from individual hutches at 8 weeks of age to group pens (five heifers/pen) and remained on the same treatment for the next 84 days. During this 84-day period, heifers receiving Rumensin gained more weight at a faster rate and tended to be more efficient than heifers fed Bovatec. No differences were observed in feed intake, skeletal growth as measured by hip height, or body condition score.; Dairy Day, 1999, Kansas State University, Manhattan, KS, 1999;

Keywords

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EFFECTS OF RUMENSIN AND BOVATEC ON GROWTH, FEED INTAKE, AND FEED EFFICIENCY IN DAIRY CALVES

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Summary

One hundred Holstein heifers were used to examine the effects of monensin (Rumensin®) and lasalocid (Bovatec®) included in calf starter and grower diets. Heifers were assigned alternately at birth to a starter feed containing either Rumensin (28 g/ton, 90% dry matter basis) or Bovatec (40 g/ton, 90% dry matter basis). The Bovatec group was switched to a starter feed containing 28 g Bovatec/ton (90% dry matter basis) at 6 weeks of age. Both groups were switched at 8 weeks of age to grower diets designed to deliver 100 mg/head/day of either Rumensin or Bovatec. No treatment differences were observed between birth and 8 weeks of age. Heifers were moved from individual hutches at 8 weeks of age to group pens (five heifers/pen) and remained on the same treatment for the next 84 days. During this 84-day period, heifers receiving Rumensin gained more weight at a faster rate and tended to be more efficient than heifers fed Bovatec. No differences were observed in feed intake, skeletal growth as measured by hip height, or body condition score.

(Key Words: Calves, Replacement Heifers, Rumensin, Bovatec.)

Introduction

Dairy heifers often experience a reduction in rate of gain for the first week or two after moving from individual calf hutches to group pens. Various techniques have been tried to overcome this loss, including blending starter and grower feeds and delaying movement until heifers are consuming 5 lb of feed per day. Stress-induced reduction in feed consumption or decreased efficiency in feed utilization may be factors explaining this decrease in growth rate. Inclusion of ionophores in the starter feed offers a potential means of alleviating this reduction in gain.

Both Rumensin® (monensin) and Bovatec® (lasalocid) have claims for increased rate of weight gain in dairy replacement heifers. Additional claims of these ionophores include control and prevention of coccidiosis, and improved feed efficiency in calves and improved feed efficiency in cattle fed in confinement for slaughter. Little information is available that compares concurrently the efficacy of each ionophore in heifers from birth to 20 weeks of age. This period includes the transition from individual hutches to group pens. The objective of this study was to determine the efficacy for preventing and controlling coccidiosis and effects on feed intake, weight gain, hip height, and feed efficiency, when these ionophores were included in the diet beginning at 1 to 3 days of age.

Procedures

One hundred female Holstein calves from the Kansas State University dairy herd were utilized in this study, which consisted of Phase I (birth to 8 weeks of age) and Phase II (8 to 20 weeks of age). Calves were assigned alternately at birth to treatment diets containing either Rumensin or Bovatec. Calves were paired based on birth date, except for the final two pairings. This occurred because two calves died (one on each treatment) and were replaced to bring the total number of heifers to 100 (50/treatment). Calves were moved from the maternity area to individual hutches within 48 hours after birth and offered a starter feed (pelleted) containing

either Rumensin (28 g/ton, 90% dry matter basis) or Bovatec (40 g/ton, 90% dry matter basis) along with whole milk (4% of body weight). Whole milk was fed twice daily, and starter feed was fed once daily. The amounts of starter feed fed and consumed were recorded daily. Feed refusal was weighed before each new daily allocation. One measured tablespoon of wet molasses was distributed over the top of the daily starter feed allocation to stimulate intake. Calves were weaned when they consumed 2 lb of starter feed for 3 consecutive days. If this level of intake was not achieved by 36 days of age, milk offered was reduced by 50% to stimulate starter feed intake. The starter pellets (Table 1) were manufactured at the Grain Science Feed Mill located on the Kansas State University campus. Each batch was sampled and shipped to Elanco Animal Health (Greenfield, IN) for Rumensin compliance analysis or Hoffman-LaRoche (Belvidere, NJ) for Bovatec compliance analysis before they were used in the study. Forages were sampled weekly and composited monthly, and grain mixes were sampled by batch for analysis. Silage was analyzed weekly for dry matter, and the amount fed adjusted accordingly. The primary source of protein in the Phase II diets was alfalfa hay (21% CP) offered in a TMR with corn silage and a grain mix containing ground corn and a mineral and vitamin premix. The ionophores were mixed with ground corn and offered as a topdressing.

Table 1. Calf Starter-Pellet Composition

Ingredient	% of Dry Matter
Cracked corn	54.5
Rolled oats	20.1
Molasses	3.9
Soybean meal	19.8
Mineral-vitamin premix	1.6

Body weight and hip height measurements were obtained within 24 hours after birth, at weaning, and when calves were moved from the hutches to the group pens (8 weeks ± 3 days of age). This was done on a Wednesday after group pen daily feed refusal was determined. Group pen feed offered was recalculated to include the new addition (five) to the pen. Twenty-two group pens were utilized in Phase II. Eight pens for each treatment contained five heifers, two pens contained four heifers and one pen contained two heifers. The average number of days required to fill the Bovatec pens was 25 (range 14 to 35), and the average number required to fill the Rumensin pens was 19 (range 14 to 35). The first calves entered Phase II on February 25, 1998 and the last calves entered Phase II on October 25, 1998 for both treatment groups. Once a heifer entered a pen, it remained in there until the last calf entering the same pen completed 84 days. The average days in group pens were 98.1 and 94.6 for Bovatec and Rumensin groups, respectively, and were not significantly different.

Treatment pens were paired based on the date they were filled. Because alternate calves were assigned to treatments at birth, the average age of calves in paired pens was similar. Pens were arranged in two rows, and treatment groups were assigned to alternating pens to reduce location effect. The amount of TMR fed was based on the number of calves per pen and the average weight of calves within the pen plus 14 lb of body weight per calf (projected gain in 7 days). Individual calf weights were obtained every Tuesday, and the amount of TMR fed was adjusted every Wednesday. Paired pens received the same amount of TMR per head based on the average weight of heifers in the heaviest pen to ensure that sufficient feed was available to achieve the desired rate of gain. The ionophores were mixed with finely ground corn at the rate of 200 g/ton and fed as a topdressing to deliver 100 mg/head/day (1 lb of topdressing per head per day).

Heifers were weighed within 24 hr of birth; at weaning; when moved from hutches to group pens; and on days 28, 56, and 84 following movement into group pens. Hip height was measured within 24 hr of birth,

when heifers were moved to group pens; and at the end of the trial. Feces of individual calves in hutches were scored daily using the scale of: 1 = normal, solid; 2 = with consistency of partially melted soft-serve ice cream; 3 = moderate scours with consistency of pancake batter, spread out without firm parts; 4 = primarily liquid with consistency of water; and 5 = bloody. After calves were moved to group pens, a fecal score was determined weekly for the pen. All heifers were observed daily, and their health conditions were recorded along with appropriate follow-up observation and therapy.

Results and Discussion

The responses of dairy calves to Rumensin or Bovatec inclusion in starter feed (birth to 8 weeks of age) are shown in Table 2. The average daily gain and dry matter intake were lower than expected based on previous experience and probably were due to the pelleted feed used in the study. The low intakes of both starter feeds reduced the average intakes of Rumensin and Bovatec to 26 and 37 mg per head per day, respectively, during the 8-week period. No differences were observed in performance traits measured. Further, none of the calves experienced coccidiosis, and fecal scores for both groups averaged less than 2.

The responses of dairy heifers during Phase II (8 to 20 weeks of age) of the study are shown in Table 3. Average daily gain was greater ($P<.01$) for heifers receiving Rumensin than for those fed Bovatec. Dry mater intake and lbs. of gain per lb of feed were similar between the two treatments. The diets in Phase II were formulated to provide sufficient protein to support 2 lb of daily gain. The reason for this formulation was to test the ability of the ionophores to improve energy efficiency through their effects on rumen fermentation. Additional protein was included to ensure that it was not limiting.

Exposure to this type of grower diet without a transition period probably accounted for the slow rate of gain during the first 28 days after calves were moved from hutches to group pens. Calves fed Rumensin gained faster ($P<.05$) than those fed Bovatec during this period. These results agree with the concept that Rumensin improves rate of gain when added to high forage diets. The use of ionophores in starter and grower diets offer a convenient method to control coccidiosis and potentially improve feed efficiency. Further studies with a more palatable starter feed are warranted.

Table 3. Effect of Ionophores on Performance of Dairy Heifers from Birth to 8 Weeks of Age (Phase I)

	Treatment			
Item	Bovatec	Rumensin	SEM	P-Value
Birth wt, lb	79.5	79.5	1.4	.98
Weaning wt, lb	111	108	1.9	.28
Weight at 8 weeks, lb	132	131	2.27	.72
Days to weaning	40.6	41.0	.58	.70
Days to weaning weight	43.6	43.2	.17	.07
Days in hutches	56.4	56.9	.24	.10
Daily gain, lb				
Birth to weaning	.72	.66	.03	.16
Birth to 8 weeks	.92	.89	.03	.50
Daily intake (DM), lb	1.87	1.86	.04	.86
Gain/feed	.50	.48	.01	.37
Hip height, inches				
Birth	30.4	30.2	.20	.52
Weaning	32.9	33.1	.23	.58
8 weeks	34.1	34.2	.23	.81

Table 3. Effects of Ionophores on Performance of Dairy Heifers from 8 to 20 Weeks of Age (Phase II)

	Treatment			
Item	Bovatec	Rumensin	SEM	P-Value
Hip height, inches				
56 days of age	34.1	34.2	.32	.75
140 days of age	38.2	38.4	.16	.37
Body weight, lb				
56 days of age	130	133	3.07	.60
84 days of age	166	174	3.48	.12
112 days of age	216	229	3.11	.01
140 days of age	267	282	3.90	.02
Daily gain				
56-84 days of age	1.28	1.49	.06	.03
56-112 days of age	1.53	1.73	.03	.001
56-140 days of age	1.62	1.78	.02	.0006
Daily intake (DM), lb	7.04	7.05	.08	.90
Gain/feed	.24	.26	.009	.22
Average days in pen	98	95	1.4	.11